REMARKS

1. This paper is responsive to the Office Action mailed September 24, 2003. Reconsideration and further examination is respectfully requested.

2. In brief, the present invention is a method of selecting data from a computer graphics frame buffer in an efficient manner for display.

3. Claims 1-10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lawless et al. (US Pat. # 5,371,514) in view of Kim et al (US Pat # 5,355,443).

4. Regarding claim 1, the Examiner claimed that, "Lawless teaches the claimed 'display system' comprising: 'a memory, containing graphics data, divided into logical regions' (Lawless, column 5, lines 22-48); and 'an attribute system, connected to said memory wherein said attribute system selects graphics data from fewer than all of said logical regions and transmits said graphics data to a display' (Lawless, column 6, lines 3-31)." Assuming arguendo that Lawless' primitive depth data acts as an attribute, this attribute is used on a per-primitive basis as shown in column 5, lines 48-59, while in applicant's invention the attribute data is used on a per-pixel basis. Independent claim 1 has been amended to include the limitation that the attribute system contains attribute data for each pixel of a monitor, mirroring the limitations of independent claims 7 and 9. Thus, applicant believes that independent claim 1 is distinguished from Lawless and is now in a condition for allowance.

5. The Examiner admits that, "Lawless does not explicitly teach the 'frame buffer attribute data' as claimed. However, Kim teaches that such frame attribute for the arrangement of stored data in the buffer is well known (Kim, column 18, lines 24-46). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Kim, to configure Lawless' system as claimed because the arrangement of different portions of the frame data in Lawless (e.g., figure 8) can be used to define 'frame buffer attribute' for the arrangement of stored data in the buffer as claimed." However, frame buffer attribute data contains information on which portion of the frame buffer memory is currently displayed on the monitor, not the arrangement of stored data in the frame buffer. The frame attribute that Kim teaches is the well known technique of having a window smaller than the frame buffer memory and moving that window around the frame buffer memory, selectively displaying portions of the frame buffer memory. In applicant's invention, for each possible location of the window, there are multiple logical regions of frame buffer memory, any of which may be displayed varying on a per-pixel basis. The attribute data automatically selects which of these multiple logical regions will be displayed. In Kim's invention, for each possible location of the window there is only one logical region of frame buffer memory to be displayed on the monitor and this logical region is determined only by the location of the window within the frame buffer memory. Thus, even assuming arguendo that Kim shows the frame buffer attribute data which allows the selection of graphics data from fewer than all of said logical regions, this selection is done on a per-window basis where the color of each pixel is determined by the values in the frame buffer memory selected with respect to the window size and location. This is substantially different from

applicant's invention where for any given window size and location there are multiple logical regions of frame buffer memory to select between for display. This selection is done through the per-pixel attribute data.

6. Also, note that in column 18, lines 44-46, Kim explicitly states that, "**the operator** selects which regions of which frame buffers will be displayed on the video monitor..." This directly contradicts one of the features of applicant's invention. In the present invention, attribute data referring to the logical region(s) of memory to be accessed from the display of a given tile of pixels is used to **automatically** select the correct region of memory from a plurality of regions of frame buffer memory. Claim 1 has been amended to clarify that this selection of logical regions is automatic, not requiring any intervention on the part of the user. Unlike applicant's invention, Kim requires the operator to make the selection. Thus, applicant believes that the limitations of an attribute system [that] automatically selects graphics data from fewer than all of said logical regions based on said attribute data are clearly distinguished from the Lawless and Kim patents. Thus, applicant believes that claim 1 has been adequately distinguished from the Lawless and Kim patents and is in a condition suitable for allowance.

7. Regarding claim 2, the Examiner claimed that, "Claim 2 adds into claim 1 the store of graphics data and frame attribute data in separate physical memories which Kim teaches in figure 8 and Lawless suggests in figures 3 and 8." However, as discussed above, neither Lawless nor Kim claim, teach, or suggest an attribute system ... [that] automatically selects graphics data from fewer than all of said logical regions based on said attribute data. Thus, while the frame buffer memory and the video RAM disclosed by Kim may comprise physically separate

memory devices, since neither Lawless nor Kim disclose attribute data capable of distinguishing between logical regions of frame buffer memory on a per-pixel basis, applicant's claims are distinguished from the inventions disclosed by Lawless and Kim. Thus, applicant also believes that claim 2 has been adequately distinguished from the Lawless and Kim patents, and is therefore in a condition suitable for allowance.

8. Regarding claim 3, the Examiner stated that, "Lawless teaches the claimed 'display system' comprising: 'a memory, containing graphics data, divided into logical regions' (Lawless, column 5, lines 22-48); and 'a regions system, that calculates which regions of said graphics data contain data necessary for display of a block of pixels; wherein said regions are fewer than all of said logical regions' (Lawless, column 6, lines 3-31)." Assuming arguendo that Lawless' primitive depth data acts as an attribute, this attribute is used on a per-primitive basis as shown in column 5, lines 48-59, while in applicant's invention the attribute data is used on a per-pixel basis. Independent claim 3 has been amended to include the limitation that the attribute system contains attribute data for each pixel of a monitor, mirroring the limitations of independent claims 7 and 9. Thus, applicant believes that independent claim 3 is distinguished from Lawless and is now in a condition for allowance.

9. The Examiner admits that, "Lawless does not explicitly teach the 'frame buffer attribute data' as claimed. However, Kim teaches that such frame attribute for the arrangement of stored data in the buffer is well known (Kim, column 18, lines 24-46). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Kim, to configure

Lawless' system as claimed because the arrangement of different portions of the frame data in Lawless (e.g., figure 8) can be used to define 'frame buffer attribute' for the arrangement of stored data in the buffer as claimed." However, frame buffer attribute data contains information on which portion of the frame buffer memory is currently displayed on the monitor, not the arrangement of stored data in the frame buffer. The frame attribute that Kim teaches is the well known technique of having a window smaller than the frame buffer memory and moving that window around the frame buffer memory, selectively displaying portions of the frame buffer memory. In applicant's invention, for each possible location of the window, there are multiple logical regions of frame buffer memory, any of which may be displayed varying on a per-pixel basis. The attribute data automatically selects which of these multiple logical regions will be displayed. In Kim's invention, for each possible location of the window there is only one logical region of frame buffer memory to be displayed on the monitor and this logical region is determined only by the location of the window within the frame buffer memory. Thus, even assuming arguendo that Kim shows the frame buffer attribute data which allows the selection of graphics data from fewer than all of said logical regions, this selection is done on a per-window basis where the color of each pixel is determined by the values in the frame buffer memory selected with respect to the window size and location. This is substantially different from applicant's invention where for any given window size and location there are multiple logical regions of frame buffer memory to select between for display. This selection is done through the per-pixel attribute data.

10. Also, note that in column 18, lines 44-46, Kim explicitly states that, "**the operator** selects which regions of which frame buffers will be displayed on the

video monitor..." This directly contradicts one of the features of applicant's invention. In the present invention, attribute data referring to the logical region(s) of memory to be accessed from the display of a given tile of pixels is used to **automatically** select the correct region of memory from a plurality of regions of frame buffer memory. Claim 3 has been amended to clarify that this selection of logical regions is automatic, not requiring any intervention on the part of the user. Unlike applicant's invention, Kim requires the operator to make the selection. Thus, applicant believes that the limitations of an attribute system [that] automatically selects graphics data from fewer than all of said logical regions based on said attribute data are clearly distinguished from the Lawless and Kim patents. Thus, applicant believes that claim 3 has been adequately distinguished from the Lawless and Kim patents and is in a condition suitable for allowance.

11. Regarding claim 4, the Examiner stated that, "Claim 4 adds into claim 3 the store of graphics data and frame attribute data in physically separate memories which Kim teaches in figure 8 and Lawless suggests in figures 3 and 8." However, as discussed above, applicant believes that claim 3 has been sufficiently distinguished from Lawless and Kim and is in a condition for allowance. Since dependent claim 4 includes all of the limitations of claim 3, applicant believes that it too is in a condition for allowance.

12. Regarding claim 5, the Examiner stated that, "Claim 5 adds into claim 3 'wherein said regions systems sends identities of said regions to a screen refresh unit; and wherein said screen refresh unit, calculates memory addresses from said identities and sends selected graphics data from said memory to a display' which Lawless teaches in column 11, lines 34-49." However, as discussed above, applicant

believes that claim 3 has been sufficiently distinguished from Lawless and Kim and is in a condition for allowance. Since dependent claim 5 includes all of the limitations of claim 3, applicant believes that it too is in a condition for allowance.

13. Regarding claim 6, the Examiner stated that, "Claim 6 adds into claim 5 'said logical regions further comprising memory to store graphics data for each pixel of a monitor' which Kim teaches in figure 8 and Lawless suggests in figures 3 and 8." However, as discussed above, applicant believes that claim 3 has been sufficiently distinguished from Lawless and Kim and is in a condition for allowance. Since dependent claim 6 includes all of the limitations of claims 3 and 5, applicant believes that it too is in a condition for allowance.

14. Regarding claim 7, the Examiner stated that, "Lawless teaches the claimed 'method for selectively reading pixel data from a frame buffer memory array' comprising: 'defining a plurality of regions of frame buffer memory, wherein each region comprises memory to store graphics data for each pixel of a monitor' (Lawless, column 5, lines 22-48); and 'calculating a subset of said regions of frame buffer memory that are required to display said pixel on said monitor; and retrieving from said frame buffer memory pixel data only from said subset of regions of frame buffer memory that are required to display said pixel on said monitor' (Lawless, column 6, lines 3-31)." Assuming arguendo that Lawless' primitive depth data acts as an attribute, this attribute is used on a per-primitive basis as shown in column 5, lines 48-59, while in applicant's invention the attribute data is used on a per-pixel basis.

15. The Examiner admits that, "Lawless does not explicitly teach the 'storing attribute data for each pixel in a memory, wherein said attribute data encodes which of said regions are to be displayed on said monitor; retrieving said attribute data for a pixel from said memory' as claimed. However, Kim teaches that such pixel attribute for the arrangement of stored data in the buffer is well known (Kim, column 18, lines 24-46). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Kim, to configure Lawless' system as claimed because the arrangement of different portions of the frame data in Lawless (e.g., figure 8) can be used to define 'attribute data encodes which of said regions are to be displayed on said monitor' for the arrangement of stored data in the buffer as claimed." However, frame buffer attribute data contains information on which portion of the frame buffer memory is currently displayed on the monitor, not the arrangement of stored data in the frame buffer. The frame attribute that Kim teaches is the well known technique of having a window smaller than the frame buffer memory and moving that window around the frame buffer memory, selectively displaying portions of the frame buffer memory. In applicant's invention, for each possible location of the window, there are multiple logical regions of frame buffer memory, any of which may be displayed varying on a per-pixel basis. The attribute data automatically selects which of these multiple logical regions will be displayed. In Kim's invention, for each possible location of the window there is only one logical region of frame buffer memory to be displayed on the monitor and this logical region is determined only by the location of the window within the frame buffer memory. Kim simply doesn't show any attribute data encoding which of the regions are to be displayed on the monitor. Kim's invention uses the

position of the window within the frame buffer to determine which region of frame buffer memory to display on the monitor, not separate attribute data stored for each pixel of the monitor. Thus, applicant believes that claim 7 has been distinguished from Lawless and Kim and is in a condition for allowance.

16. Regarding claim 8, the Examiner stated that, "Claim 8 adds into claim 7 'wherein said graphics data and said attribute data are stored in said frame buffer memory' which Kim teaches in figure 8 and Lawless suggests in figures 3 and 8." However, as discussed above, applicant believes that claim 7 has been sufficiently distinguished from Lawless and Kim and is in a condition for allowance. Since dependent claim 8 includes all of the limitations of claim 7, applicant believes that it too is in a condition for allowance.

17. Regarding claim 9, the Examiner stated that, "Lawless teaches the claimed 'method for selectively reading pixel data from a frame buffer memory array' comprising: 'defining a plurality of regions of frame buffer memory, each region further compring memory to store graphics data for each pixel of a monitor' (Lawless, column 5, lines 22-48); and 'calculating a subset of said regions of frame buffer memory that are required to display said tile on said monitor; and retrieving from said frame buffer memory pixel data only from said subset of regions of frame buffer memory that are required to display said tile on said monitor' (Lawless, column 6, lines 3-31)." Assuming arguendo that Lawless' primitive depth data acts as an attribute, this attribute is used on a per-primitive basis as shown in column 5, lines 48-59, while in applicant's invention the attribute data is used on a per-pixel basis.

18. The Examiner admits that, "Lawless does not explicitly teach the 'storing attribute data for each pixel in a memory, encoding which of said regions are to be displayed on said monitor using the attribute data; defining groups of pixels as tiles; selecting a tile for display on said monitor; retrieving said attribute data for said tile from said memory' as claimed. However, Kim teaches that such pixel attribute for the arrangement of stored data in the buffer is well known (Kim, column 18, lines 24-46). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Kim, to configure Lawless' system as claimed because the arrangement of different portions of the frame data in Lawless (e.g., figure 8) can be used to define 'attribute data encodes which of said regions are to be displayed on said monitor' for the arrangement of stored data in the buffer as claimed." However, frame buffer attribute data contains information on which portion of the frame buffer memory is currently displayed on the monitor, not the arrangement of stored data in the frame buffer. The frame attribute that Kim teaches is the well known technique of having a window smaller than the frame buffer memory and moving that window around the frame buffer memory, selectively displaying portions of the frame buffer memory. In applicant's invention, for each possible location of the window, there are multiple logical regions of frame buffer memory, any of which may be displayed varying on a per-pixel basis. The attribute data automatically selects which of these multiple logical regions will be displayed. In Kim's invention, for each possible location of the window there is only one logical region of frame buffer memory to be displayed on the monitor and this logical region is determined only by the location of the window within the frame buffer memory. Kim simply doesn't show any attribute data encoding

which of the regions are to be displayed on the monitor. Kim's invention uses the position of the window within the frame buffer to determine which region of frame buffer memory to display on the monitor, not separate attribute data stored for each pixel of the monitor. Thus, applicant believes that claim 9 has been distinguished from Lawless and Kim and is in a condition for allowance.

19. Regarding claim 10, the Examiner stated that, "Claim 10 adds into claim 9 'wherein said graphics data and said attribute data are stored in said frame buffer memory' which Kim teaches in figure 8 and Lawless suggests in figures 3 and 8." However, as discussed above, applicant believes that claim 9 has been sufficiently distinguished from Lawless and Kim and is in a condition for allowance. Since dependent claim 10 includes all of the limitations of claim 9, applicant believes that it too is in a condition for allowance.

20. For these reasons, this application is considered to be in condition for allowance and such action is earnestly solicited.

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Respectfully submitted,

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